Notice of Allowability	Application No.	Applicant(s)	
	09/734,696	FREIRE ET AL.	
	Examiner	Art Unit	
	Marjorie A. Moran	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *10/27/03*.

2. ☒ The allowed claim(s) is/are *2,13,18 and 19*.

3. ☒ The drawings filed on *13 December 2000* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *20040223* .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

Marjorie A. Moran
Primary Examiner
Art Unit: 1631

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/22/03 has been entered.

Examiner's Amendment

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Ruth Tyler-Cross on 2/23/03.

The application has been amended as follows:

LISTING OF CLAIMS

1. (Cancelled)

2. (Previously amended) A computer-assisted method for predicting the binding affinity of a compound for a binding target of a molecule, using a programmed computer including a processor, an input device, and an output device, including the steps of:

i) inputting into the programmed computer, through the input device, data including the identity and three-dimensional coordinates of each of the atoms in the molecule;

ii) determining, using the processor, for each atom in the molecule, a predicted Gibbs free energy of binding of the atom to an ideal ligand;

iii) generating, using the processor, a three-dimensional prediction model of binding targets in the molecule by generating, using the three-dimensional coordinates of each of the atoms in the molecule, a model of the atoms in the molecule and mapping onto each atom depicted in the model the corresponding determined predicted Gibbs free energy of binding;

iv) identifying as a binding target a region of the molecule with a high density of atoms which exhibit favorable Gibbs free energy of binding to said ideal ligand,

v) inputting into the programmed computer, through the input device, data including the identity and three-dimensional coordinates of each of the atoms in the binding target,

vi) inputting into the programmed computer, through the input device, data including the identity and three-dimensional coordinates of each of the atoms in the compound;

vii) generating, using the processor, a model of the compound bound to the binding target;

viii) determining, using the processor, the three-dimensional coordinates of an energy minimized structure of the compound when the compound is bound to the binding target; and

ix) determining, using the processor, a predicted binding affinity of the energy minimized compound for the binding target.

3-12. (Cancelled)

13. (Previously amended) A computer program, residing on a computer-readable medium, for predicting the binding affinity of a compound for a binding target of a molecule, the computer

program including instructions for causing a computer to:

i) receive data including the identity and three-dimensional coordinates of each of the atoms in the molecule;

ii) determine, for each atom in the molecule, a predicted Gibbs free energy of binding of the atom to an ideal ligand for the atom;

iii) generate a three-dimensional prediction model of binding targets in the molecule by generating, using the three-dimensional coordinates of each of the atoms in the molecule, a model of the atoms in the molecule and mapping onto each atom depicted in the model the corresponding determined predicted Gibbs free energy of binding;

iv) identify as a binding target a region of the molecule with a high density of atoms which exhibit favorable Gibbs free energy of binding to said ideal ligand,

v) receive data including the identity and three-dimensional coordinates of each of the atoms in the binding target;

vi) receive data including the identity and three-dimensional coordinates of each of the atoms in the compound;

vii) generate a model of the compound bound to the binding target;

viii) determine the three-dimensional coordinates of an energy minimized structure of the compound when the compound is bound to the binding target; and

ix) determine a predicted binding affinity of the energy minimized compound for the binding target.

14 -17. (Cancelled)

18. (New) A computer-assisted method for ranking each ligand in a set of ligands by its predicted binding affinities for binding to a binding target of a molecule, using a programmed computer including a processor, and input device, and an output device, including the steps of:

i) inputting into the programmed computer, through the input device, data including the identity and three-dimensional coordinates of each of the atoms in the molecule;

ii) determining, using the processor, for each atom in the molecule, a predicted Gibbs free energy of binding of the atom to an ideal ligand;

iii) generating, using the processor, a three-dimensional prediction model of binding targets in the molecule by generating, using the three-dimensional coordinates of each of the atoms in the molecule, a model of the atoms in the molecule and mapping onto each atom depicted in the model the corresponding determined predicted Gibbs free energy of binding;

iv) identifying as a binding target a region of the molecule with a high density of atoms which exhibit favorable Gibbs free energy of binding to said ideal ligand,

v) inputting into the programmed computer, through the input device, data including the identity and three-dimensional coordinates of each of the atoms in the binding target,

vi) inputting into the programmed computer, through the input device, data including the identity and three-dimensional coordinates of each of the atoms in each ligand in the set of ligands;

vii) generating, using the processor, a model of each ligand in the set of ligands bound to the binding target;

viii) determining, using the processor, the three-dimensional coordinates of an energy minimized structure of each ligand in the set of ligands when each ligand in the set of ligands is bound to the binding target;

ix) determining, using the processor, a predicted binding affinity of the energy minimized structure of each ligand in the set of ligands for the binding target; and

x) ranking each ligand according to its determined predicted binding affinity.

19. (New) A computer program, residing on a computer-readable medium, for ranking each ligand in a set of ligands by its predicted binding affinities for binding a binding target of a molecule, the computer program including instructions for causing a computer to:

i) receive data including the identity and three-dimensional coordinates of each of the atoms in the molecule;

ii) determine, using the processor, for each atom in the molecule, a predicted Gibbs free energy of binding of the atom to an ideal ligand;

iii) generate, using the processor, a three-dimensional prediction model of binding targets in the molecule by generating, using the three-dimensional coordinates of each of the atoms in the molecule, a model of the atoms in the molecule and mapping onto each atom depicted in the model

the corresponding determined predicted Gibbs free energy of binding;

iv) identify as a binding target a region of the molecule with a high density of atoms which exhibit favorable Gibbs free energy of binding to said ideal ligand,

v) receive data including the identity and three-dimensional coordinates of each of the atoms in the binding target,

vi) receive data including the identity and three-dimensional coordinates of each of the atoms in each ligand in the set of ligands;

vii) generate, using the processor, a model of each ligand in the set of ligands bound to the binding target;

viii) determine, using the processor, the three-dimensional coordinates of an energy minimized structure of each ligand in the set of ligands when each ligand in the set of ligands is bound to the binding target;

ix) determine, using the processor, a predicted binding affinity of the energy minimized structure of each ligand in the set of ligands for the binding target; and

x) rank each ligand according to its determined predicted binding affinity.

Election/Restrictions

Claims 2 and 13 are directed to an allowable method and product for the reasons set forth below. Previously withdrawn claims 4 and 15 are directed to a method and product reciting similar limitations to those of claims 2 and 13. As the additional steps of the method and program of claims 2 and 13 do not render the claims patentably distinct from claims 2 and 13, claims 4 and 15 are hereby rejoined with claims 2 and 13. The subject matter of claims 4 and 15 have been recaptured in new claims 18 and 19, introduced by examiner's amendment (above), therefore claims 2, 13, 18 and 19 are pending.

Reasons for Allowance

The following is an examiner's statement of reasons for allowance: the prior art does not teach or fairly suggest the claimed method/program steps, as argued by applicant in the response filed 7/22/03.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Claims 2, 13, and 18-19 are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marjorie A. Moran whose telephone number is (571) 272-0720. The examiner can normally be reached on Mon. to Wed, 7:30-4; Thurs 7:30-6; Fri 7-1 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Woodward can be reached on (571)272-0722. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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